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# Learning Tool

Developed By:

Robert B. Kozma and  
John Van Roekel

Arborworks, Inc.





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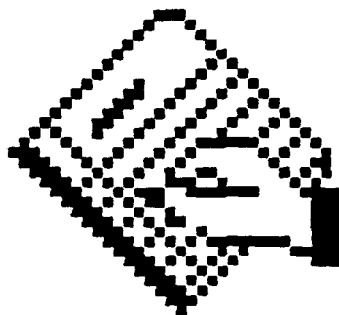
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# Learning Tool™ Manual

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## System Specifications and Configurations

Learning Tool operates on a Macintosh with 512K or more of memory including the Macintosh SE and the Macintosh II. It is compatible with the Hierarchical File Structure, operates under Switcher (it is preconfigured for a minimum of 275K), and can print to ImageWriter and LaserWriter printers. You need a 3.0 or later version of LaserWriter. The Learning Tool disk comes configured with System 3.2, Finder 5.3, LaserWriter 3.1, LaserPrep 3.1, ImageWriter 2.3, AppleTalk ImageWriter 2.3, Clipboard File 1.0, and Scrapbook File 2.0.

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***This is dedicated to Sean, Traci, John, Ted,  
and all students everywhere***

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## Does This Problem Sound Familiar?

It is the night before the chemistry midterm and in front of you on your desk are the text book, your lecture notes, previous midterms from the house's exam file, chemistry reference books, and a jug of coffee. You *know* that you have all the information you need to ace the exam, but you are not sure where to start. Questions push their way into your mind: What's going to be on the exam? What's the big picture? What's important in the course? What did the professor stress? What did the textbook stress? How are the two connected and how do they differ? You know the answers are in front of you but where, and will you remember them? As anxiety mounts, pages flip and papers fly.

Sound familiar? How can you avoid this?

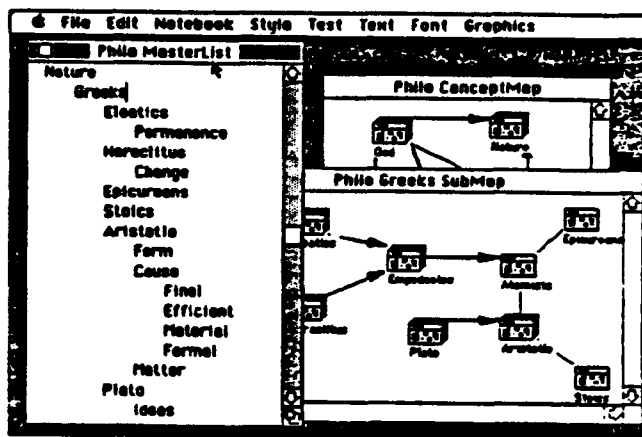
Well, the night before the exam is really too late. All of these questions are important, but you should start asking them now and you should ask them regularly. By the time the exam comes around you will be ready. You need a systematic way of studying. You need a way to organize and interrelate your ideas and notes, to re-organize them as you learn new things, a way to search your notes quickly and to periodically test yourself as you go through the semester.

## What Is Learning Tool™?

Learning Tool is a product for the Apple® 512K Macintosh™, the Macintosh XL™, and the Macintosh Plus™ computers. It is specifically designed for college students. It incorporates principles of cognitive psychology to help you learn any subject from philosophy to chemical engineering. It doesn't teach; it helps you learn. It is an "electronic notebook" that helps you organize your course notes, write term papers, and study for exams. It can help you do better in a course, but more importantly, it may even help you become a better learner. It gives you tools to build on your strengths and compensate for the shortcomings that all of us have in learning. It also gives you a model for how we learn and how it is done well.

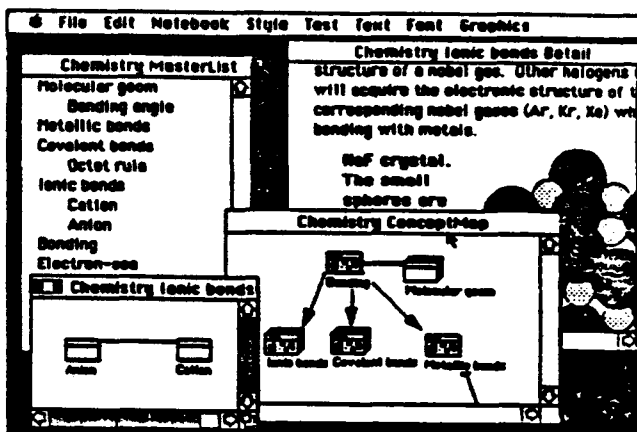
## Master List

Learning Tool operates at three coordinated levels. The Master List is an outline. It allows you to enter and organize the primary and subordinate ideas and concepts from any of your courses. Each entry automatically creates a note card in the second level, the Concept Map.



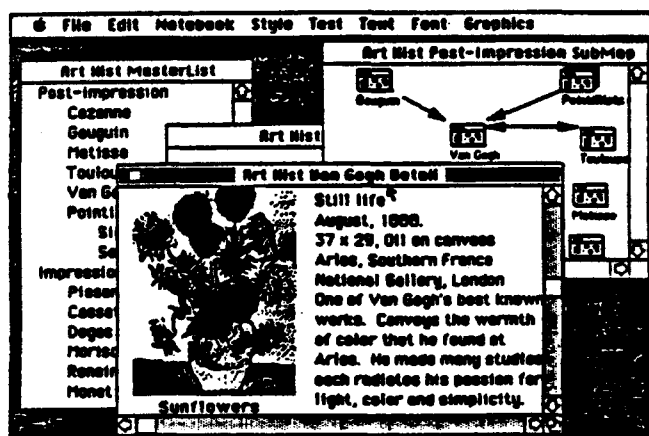
## Concept Map

In the Concept Map you can easily move note cards around to graphically organize and reorganize your ideas. You can link the note cards into a network, or map, that visually displays relationships that you define. You can also build sub maps within maps, creating complex networks in compact space.



## Note Card Detail

At the third level, you can enter information for each note card. In addition to the text and graphic functions of Learning Tool, you can use standard cut and paste techniques to exchange information with other sophisticated Macintosh software packages. You can use your notes to write a term paper on a word processor or paste more complex graphics into your note cards.



Learning Tool also allows you to do keyword searches of your note cards, test yourself on facts and concepts, open multiple note books, and print your maps and notes with the Imagewriter™ or Laserwriter™ printers.

## How to Use This Manual

This manual is designed to give you the skills needed to use Learning Tool. It is also designed to help you use Learning Tool to improve your study skills. There are two parts to the tutorial, one to get you started with Learning Tool, and the other to teach you the full set of features. It might take you two or three hours to do. It is best for you to actually use Learning Tool along with the tutorial. Make notes in the margins of this manual to help you understand and remember key points.

One way to learn about Learning Tool is to go through the tutorial, another is to just explore. Because Learning Tool uses all of the Macintosh conventions, you may find that it is very easy for you to figure out how it works. Try out the various menus and work in the different windows. See what happens; have fun!

Either while going through the manual or exploring, you may find yourself in a situation that you didn't expect or where you don't know what to do next. When this happens, turn to the section of this manual titled "troubleshooting"; this may help you out. There is also a reference section in the manual that describes how the various windows and menu commands function. This information is also available on the Learning Tool disk in the form of on-screen help. This help can be accessed at any time you are inside Learning Tool by hitting the Command key and the H key at the same time. The help file is actually a Learning Tool notebook and you can get detailed information about a term on the Master List by triple-clicking it. We will tell you more about this in the tutorial.

Finally, in the manual, there are suggestions on how you and your professors can use Learning Tool to help you study better and improve your learning skills.

## Building on What You Know

Learning Tool is a product for the Macintosh and uses all of the standard Macintosh conventions. Thus if you know how to use the Macintosh and some of its common software products like MacPaint and MacWrite, then you already know how to use many of Learning Tool's features. This manual assumes that you have some basic familiarity with the Macintosh. So, if you know terms like "mouse pointer," "icon," "scroll bar," "dragging," and "double-click" and if you know how to "open a file," "move, scroll, and resize a window," and "select a font" then many of the things discussed in this manual will sound familiar. If you are a new Macintosh user, we do provide some explanation of these terms, but it would be a good use of your time to first read through your Macintosh manual or take a Macintosh workshop from your school's microcomputer center or your local computer store. What you learn there will be reinforced in this manual. We will build on this to introduce you to functions and operations that are unique to Learning Tool.



## Getting Started

### Opening a New Notebook

To begin, insert your Learning Tool disk and turn on your Macintosh. Double-click the Learning Tool disk icon and it opens the disk window. (It may already be open.) In the Learning Tool window you see an icon that looks like this:



Learning Tool

And another that looks like this:

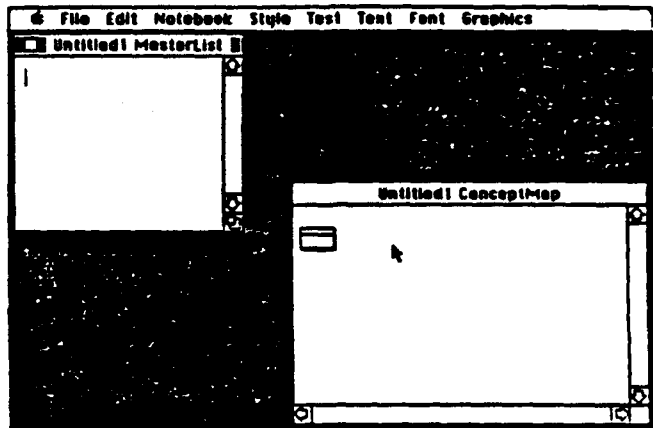


Help Notebook

The first is the icon for Learning Tool. The second for a "Notebook" created with Learning Tool; in this case one titled "Help Notebook." There are two ways to open Learning Tool:

- double-click the Learning Tool icon
- select the Learning Tool icon (single click) and select Open from the File menu

This will open a new, untitled Notebook, one without any information in it. Open a new Notebook using one of these techniques. Your Macintosh will load in Learning Tool, momentarily displaying the authors' names and the copyright notice. You will also see the familiar wait icon (a watch). When Learning Tool has been loaded, your screen will look like this, ready for you to enter your ideas and course notes:



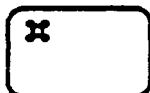
You see an Untitled1 Master List and an Untitled1 Concept Map. These are windows and they can be moved around the screen, resized, and scrolled in standard Macintosh fashion. You may want to try this now. Another feature allows you to have a particular window occupy the whole screen, giving you more room to work in it. Double-click the Title Bar on one of the windows. It zooms up to fill the screen. Double-click the Title Bar again and it zooms back to its original size and location.

### Opening a Previously Created Notebook

You can open a notebook that has already been created by selecting Open from the File menu. Do that now. A "dialog box" comes up on the screen asking you which notebook you want opened. The Help Notebook is presently the only one there and it is highlighted, or "selected," in reverse video. Open it by clicking the Open box. Alternatively, you could have opened it from the Finder (i.e., from the first window that you saw when you turned your Macintosh on) by double-clicking the Help Notebook icon. When it's open, you see the Master List and Concept Map for the Help Notebook as well as windows for the Untitled Notebook. This also demonstrates that more than one notebook can be open at a time, a feature whose advantage will become apparent in time. Although you can open a previously created notebook from within Learning Tool, you are more likely to open one when you first turn on your Macintosh. Instead of using the Learning Tool icon, you can double-click a Notebook icon. This will open both the Learning Tool application and the particular notebook you selected.

## The Help Notebook

Actually, the Help Notebook is a special case. Because you may want to use it regularly as you first start using Learning Tool, it has its own item (Open Help) on the File menu and it can also be opened by selecting it from the menu or by hitting the Command key (the command key looks like this)



and H together. You may scroll down the Master List to locate a term of interest to you. Triple-clicking the term will open its note card to provide you with information. More on Master Lists and note cards later. The Help Notebook is a reference rather than a tutorial so let's close it for now by selecting Close Notebook from the File menu. (Selecting Close will only close the active window.) This leaves you with the Untitled Notebook waiting for your ideas.

## Entering Ideas

At first you may be surprised that there is no information already in the Learning Tool. But remember, Learning Tool is a tool, or set of tools, to help you learn. It is not an instructional program for a particular course or subject. You will learn a subject by entering information into Learning Tool and by using Learning Tool to help organize and search your notes, and test yourself.

## Master List and Concept Map

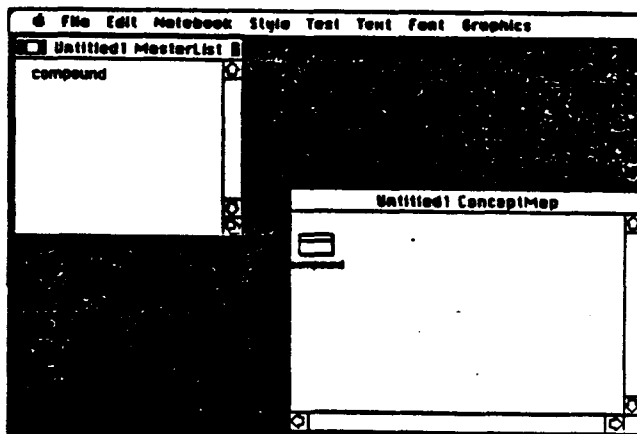
The two work spaces that automatically appear when you open Learning Tool are the Master List and the Concept Map. Although each space has unique functions and purposes, they are coordinated and things that you do in one will frequently correspond to things that happen in the other.

So, for example, you see a blinking text cursor in the Master List and a note card icon sitting in the Concept Map. (If the cursor is not in the Master List, click inside

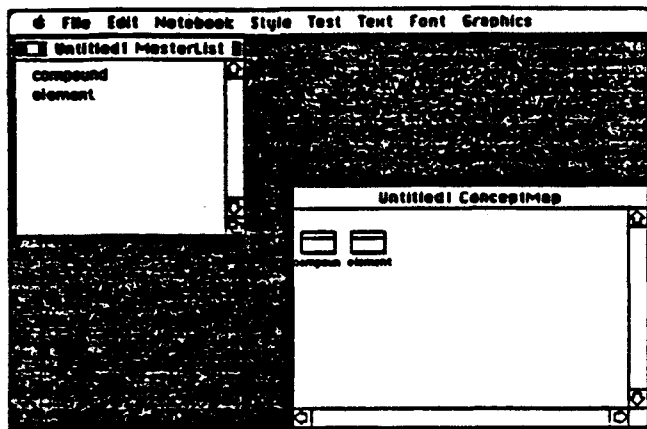
that window). These correspond to each other. Any term or concept you enter in the Master List will automatically create a note card in the Concept Map. Any note card you create in the Concept Map will automatically enter a term in the Master List.

## Entering in the Master List

Let's say you have come back from your first lecture in Introductory Chemistry. You begin using Learning Tool by analyzing your notes and thoughts and readings. What are the key terms that the professor or text book introduced or stressed? With a lecture on the structure of chemicals, "compound" is likely to be one. On the keyboard, type the term "compound." Notice that as you type in the Master List the term is simultaneously entered under the existing note card in the Concept Map. Your screen should now look like this:

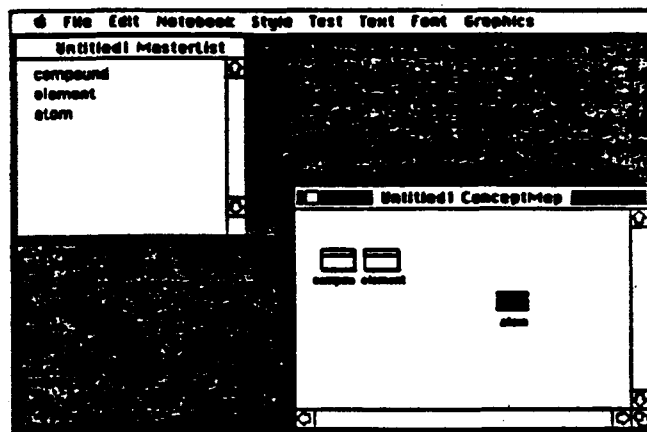


Hit return and notice that you have a "new" term highlighted in the Master List and there is a new note card waiting for you in the Concept Map. Another key concept might be "element." Type "element" without hitting return. The "new" term is replaced by "element" and also appears in the Concept Map. The term "element" has partially covered the previous term, "compound." That is not a particular problem as the whole term is still there and will be exposed by moving the cards around, a function that we will get to a bit later.



### Entering in the Concept Map

You can also enter new terms directly into the Concept Map. Move the mouse cursor over to any white space in the Concept Map and double-click. A "new" note card icon is created at that location and waits for you to enter the corresponding term. Type in "atom." Notice that it automatically appears in the Master List.



### Editing Terms

You may have mistyped or misspelled a term or for some other reason want to edit it. This is easily done in either the Master List or the Concept Map. Let's change the first letter in each term to a capital. Move the mouse cursor to the Master List, between the "c" and the "o" in "compound," and click once. Backspace and type a

capital "C." Notice that the change is simultaneously made in the Concept Map.

Now try it in the Concept Map. Place the cursor between the "e" and the "l" in "element" under its note card icon. Click once, backspace, and type a capital "E". You can, of course, change or add letters (up to 80 total) in any position in a term. You can change the entire term by double clicking it either in the Master List or Concept Map and typing in the new term.

### Organizing Your Ideas

An important part of learning is relating new ideas to those previously learned and creating new relationships among old ideas. In addition to entering key ideas, Learning Tool allows you to organize them in several ways that are intended to help you create an understanding of the relationship between the concepts you are studying. One way to organize your ideas is to move terms around in the Master List and the other is to move note cards around in the Concept Map so that related terms are near each other.

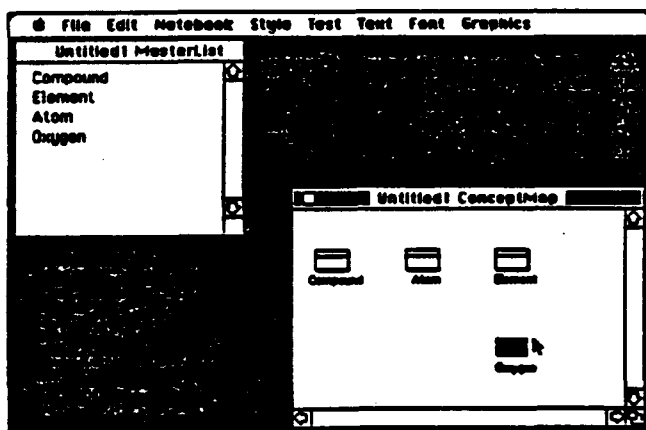
### Master List

In the Master List you may want to position terms more meaningfully than merely putting them at the end of the list, or you may want to move a term from one place to another. To enter a card in the middle of a list, position the mouse cursor at the end of the term prior to (i.e., above) the line in which you want to enter the new card. Right now, position your cursor at the end of "Element" in the Master List. Click the mouse and hit return. This moves the terms below down one line and inserts a space for your "new" term. Enter the term "Oxygen." You may also want to move a term that has already been entered. Say, for example, that you want the basic unit of structure, "atom," to be at the top of the list. Select, or double-click, "atom" and select Move Up from the Edit menu, and the term will move up one position. Repeat this until it is in a position that you desire. Move Down works similarly. A short cut is to use Command + (or Command = key) to move up and Command - to move down. The cursor keys (i.e., arrow keys) with the Option key depressed on the Macintosh Plus and Macintosh XL will accomplish this as well. Several adjacent terms can be selected and moved together. Notice that none of this has an effect on the Concept Map.



## Concept Map

Moving note cards is even easier. Position the cursor over the "Element" icon in the Concept Map and press down on the mouse button *without letting up*. Move the mouse and it will "drag" the "Element" note card to a new position. Let up on the mouse button and the note card will stay in its new location. This feature allows you to cluster your note cards in meaningful ways in your map space. Arrange things so that "Atom" is between "Compound" and "Element", to convey the fact that both compounds and elements are made of atoms, and move "Oxygen" near and below "Element" to show that oxygen is an element. Your screen might look like this:



Notice that the note cards don't position themselves exactly where you put them but align themselves along rows and columns. You can turn this invisible grid off to position a particular card exactly where you want by holding down the Command key (the one with the clover leaf on it) while you are dragging a card.

Whole groups of note cards can be moved together without destroying their positions relative to each other. First, select the group. This is done by holding down the shift key as you click each desired card. You can also do it by positioning the arrow in open space on the map; as you depress the mouse key and move the mouse (i.e., drag), a box will grow to surround and select the cards. Once the cards are selected, position the mouse arrow on any one of the cards, press the mouse key, and move the card. All of the others will follow.

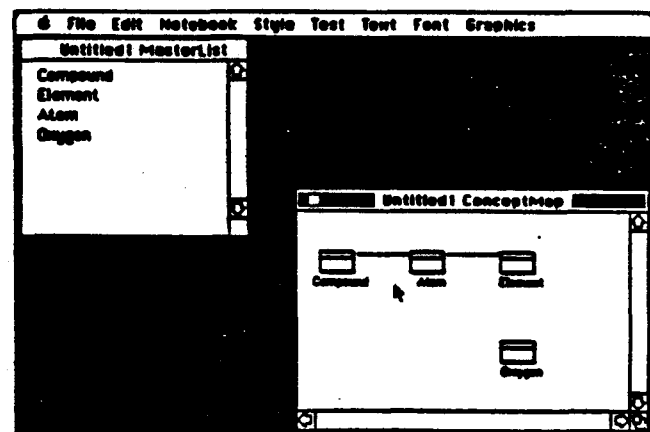
## Deleting Note Cards

You can also delete note cards that you no longer want. If you select a note card (single-click it) in a Map or a term in the Master List (double-click it) and select Clear from the Edit menu, it will eliminate both. This can also be done with the Back Space key or with the Clear Key on the key pad.

## Linking Ideas

Another means of organizing your ideas is to link them together in a way that graphically represents their relationships to each other. There are, of course, different kinds of relationships between concepts. One concept may be "an example" of another, or "a cause" of another, or "follow" it in time. A part of learning is identifying what the relationships are between ideas. Learning Tool helps you do this by prompting you to think through the relationships or "links" between concepts.

Let's say you want to show the relation between "Element" and "Atom" by drawing a line between them. Place the mouse cursor on the "Element" note card. With the Option key down, press the mouse key and move the mouse. (Remember, if you press the mouse key down without the Option key, you will move the card.) You will notice a flexible line, much like a rubber band, that follows the mouse around. Place the line on top of the "Atom" note card and release the mouse key. The line will stay. Try this again by creating a link between "Compound" and "Atom." Your screen should look something like this:

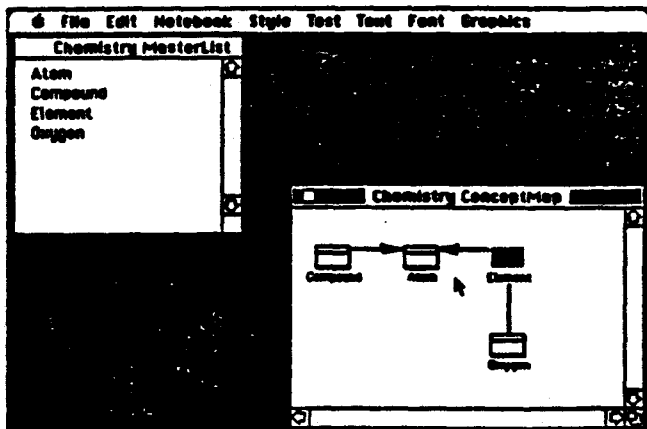


## Line Styles

Let's say you also wanted to create a link between "Element" and "Oxygen." However, the relationship between "Element" and "Oxygen" is different than the relationship between "Element" and "Atom." Elements and compounds are "made of" atoms but oxygen is an "example of" an element and you would like to show that with different line style. Pull down the Style menu and notice several line and arrow options as well as a Legend (which we will cover later). The Thin line is checked. Select the Medium line type to convey your notion of "example of." Now create a link between "Element" and "Oxygen."

## Arrows

Let's say you further want to visually convey the notion of "made of" by having the links from "Element" and "Compound" to "Atom" point to "Atom" with arrows. Select a link by clicking on top of it with the mouse button. A black dot will appear to let you know the line is selected (clicking in white space will deselect it). Pressing the Shift key and then the mouse button will allow you to select a second line without deselecting the first. Now select the Arrow item from the Style menu. The arrow will always point from the note card where you begin your link to the other note card. (Remember, you originally created your line from "Element" to "Atom." If you want to reverse the arrow, select Clear and redraw it in the other direction.) Now select Thin and Arrow from the Style menu and create a line from "Compound" to "Element" to show that compounds are made of elements. Your screen should look like this:



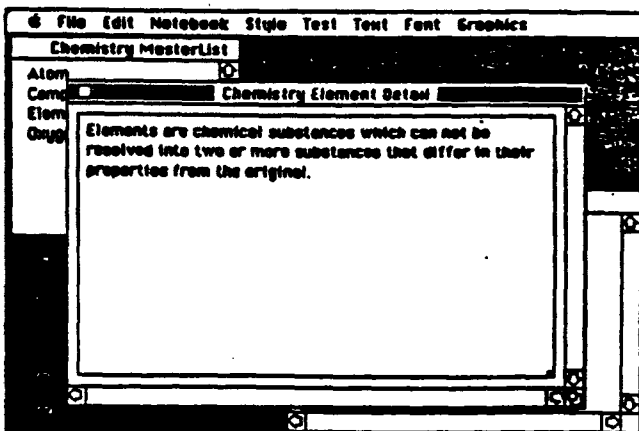
## Entering Information

As we mentioned at the beginning, Learning Tool operates at three levels. So far you have learned to work in the Master List and the Concept Map. The third level is the note card itself, the Detail level. This level allows you to enter text and graphic information in each note card. You open a note card simply by pointing to it and double-clicking it. Alternatively, you can select it and choose Detail from the Notebook menu, or as you may remember from the Help Notebook, you can triple-click the term in the Master List. Do this to the "Element" note card. The Detail window has all of the standard Macintosh window capabilities. You can move and resize it, bring a window at the bottom of a stack to the top by clicking it, and so on.

## Text Information

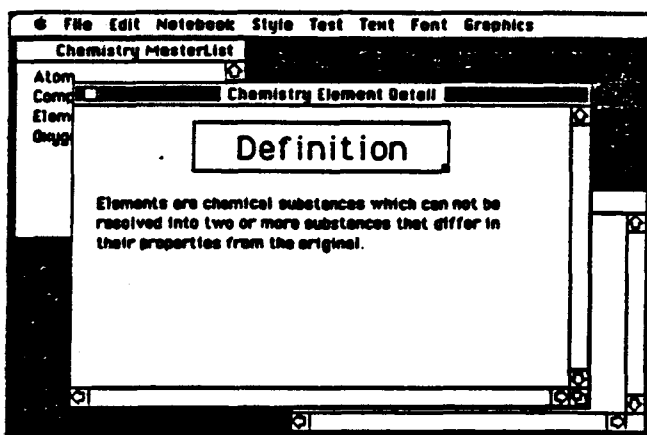
When a note card opens it will be empty. You can create an area in which you can enter text by pointing to any white space inside the window and double-clicking, or you can just start typing. What you get is a text frame bordered by a single line. A frame is a bit different from a window. You can move it by pointing the mouse arrow to any side of the frame, depressing the mouse button, and dragging the cursor. You can resize it by pointing to the little black box in the lower right hand corner and dragging it to make the frame larger or smaller.

You enter text in a frame merely by typing it in. Enter something in the "Element" window such as, "Elements are chemical substances which can not be resolved into two or more substances that differ in their properties from the original."



## Text Style

In a text frame you can use various style options from the Text menu such as Bold, Underline, etc., align Left, Center, etc. Size, and the Font options. Try them in the present Detail window. Notice that unlike MacWrite, the selection affects *all* of the text in the frame. One way of allowing you to use a variety of styles is to use multiple frames in a window. Resize the frame in the "Element" Detail window to be smaller and move it out of the way toward the bottom of the Detail window.. Create another frame by pointing the mouse cursor in a blank space and dragging. (You will notice that the lines around the previous frame disappear but the text is still there.) Now select Bold and Center and 24 point and Geneva font (or some such combination). Type the word "Definition" in the new frame. This will serve as the heading for your description of "Element." Resize and reposition it to your taste. Your screen should look something like this:



As you move the cursor around the Detail window you will notice that it changes shape from a text cursor (an "I-beam") in the current frame to an arrow in blank space to a box cursor in the other, now borderless, frame. Click the mouse button once in free space and all the borders disappear. If you click in the original frame that describes "elements" it will reactivate, the text cursor will appear and be positioned at that point, and you can enter more text. As you enter more text, it will come to the bottom of the frame and seem to disappear. Resizing the frame will show that it did not. Text automatically wraps on the right or left borders and will readjust when the frame is resized. The frame does not automatically adjust at the bottom and you may need to resize or reposition the

frame as you work. You may also need to resize the Detail window. Remember that double-clicking on the window title bar will zoom it to fill the whole screen. Moving or resizing the text frame up to and beyond the border of a window will automatically scroll it.

## Editing Text

You can edit text in a text frame using standard Macintosh edit conventions. Clicking in the middle of a sentence and typing will insert text. Backspacing will eliminate the text immediately to the left of the cursor. Selecting a letter, word, or block of text (by positioning the mouse cursor at the beginning or end of the word and dragging), activates the Cut, Copy, Paste, and Clear options from the Edit menu. These functions will allow you to delete or rearrange text easily. Selecting Clear with a frame activated but no text selected will delete the entire frame. Immediately selecting Undo will put it back.

## Graphic Information

Graphic information can be entered into a note card by creating a graphic frame in a Detail window. This is done in two ways that parallel the creation of text frames:

- with the Option key down, double-click in free space
- with the Option key down, drag in free space

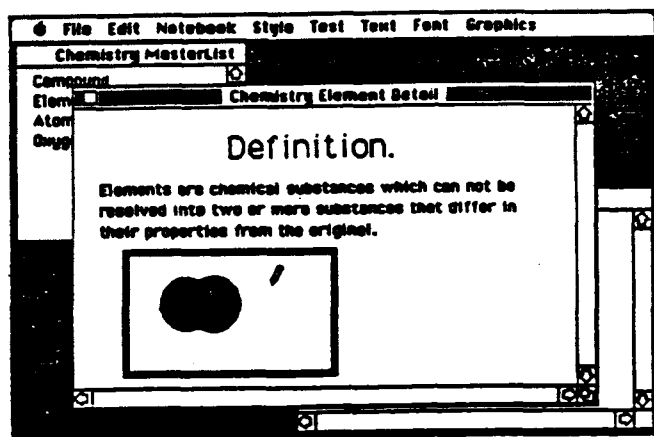
Do one of these. If you chose option-double-click, the frame will fill the whole window and appear to delete what was there. Resizing and moving the frame will show that it did not. Notice that a graphics frame has a double-line border (kind of like a picture frame) as does the box-cursor as it passes over an unselected graphics frame.

In a graphics frame you have at your disposal all of the sketch tools in the Graphics menu. The pencil is the tool initially selected in a graphics frame and a look at the Graphics menu will show that it is checked. Depressing the mouse button will activate this function and allow you to use your mouse as a sketch pencil. You may also select Rectangle, or Oval, or Line. These work by positioning the mouse cursor where you want a corner of the rectangle, the center or the oval, or an end of the line, and dragging the cursor to form your object. With the shift key depressed, rectangles are squares, ovals are circles, and lines are constrained to 0°, 45°, and 90°



angles. The Paint Can can be used to fill in enclosed spaces and is affected by the Pattern options. Lines are affected by the Style menu. The Pattern option will also affect the lines for Rectangle, Oval, and Line when these are drawn while holding the Option key down. The Eraser will, of course allow you to erase. These functions operate much as they do in MacPaint.

Use these tools to sketch a model of a molecule representing, say, the element Oxygen ( $O_2$ ). Resizing in a graphics frame will crop a picture. Resizing with the Option key down will reduce or enlarge the picture. Your picture may look something like this:



As with other Macintosh applications, you close a Detail window by clicking the "go away" box on the left side of the title bar. Notice that the note card icon has changed to let you know that you now have information in it.

## File Maintenance

### Printing Your Notes

If you want to print your work, **Page Set Up...** from the File menu allows you to indicate the printer paper you are using and to select other printing instructions. **Print Window** will print the entire contents of an active window (not just what is showing). It will print a selected Master List, Concept Map, or Detail window (both text and graphics). **Print Notebook** prints out the entire contents of your notebook, or allows you to specify the Master List, Concept Maps, and note card Detail

windows. If Master List is specified, the use of it to list page numbers, as in a table of contents, is also an option. Another option, **Top of Page**, allows you to start the printing of each Detail window and map at the top of a new page.

### Saving a Notebook

It is always a good idea to save your work periodically. This is done quickly and easily on the Macintosh by selecting the **Save** option from the File menu. This will prompt you to title your new notebook if you haven't already done so. Do this now to save your Chemistry notebook. **Save As...** is useful if you want to save your current work under one title while keeping the old work under the previous title.

You can put away your work by selecting **Close Notebook**, if you want to continue working with Learning Tool but with a different notebook (in which case you would select **New** or **Open**), or by selecting **Quit** if you want to stop altogether. (**Close** merely closes the active window.) If you have not saved your notebook since you last changed it, Learning Tool will ask if you want to do so before closing.

The basic features of Learning Tool covered so far will get you started in your courses. You will find, though, that as you enter more of your course notes you will want to take advantage of additional features that help you further organize your ideas, search your notes, study for tests, and use Learning Tool with other Macintosh application packages.

## Organization

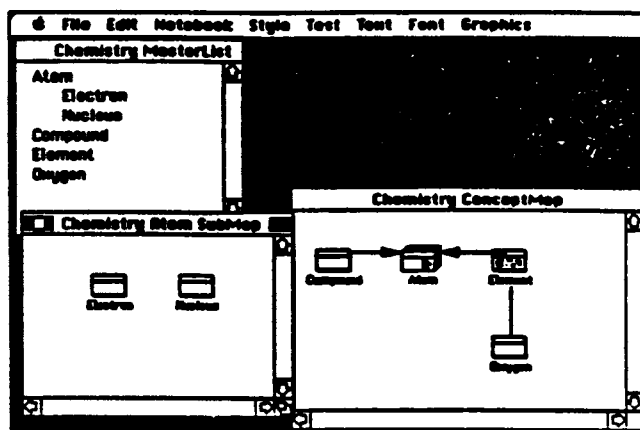
As you enter more ideas into Learning Tool the screen may become more difficult to organize. This parallels how our minds work. As we learn more and more it can become difficult to learn new concepts and even remember the ones we have already learned. An important part of learning is the organization and integration of what we have already learned so we can remember it better and it can help us in our learning of new things. One way that Learning Tool helps with this is by using links, as we have already learned. Another way is with Sub Maps.

## Sub Maps

Sub Maps allow you to integrate ideas. Open your Chemistry notebook, if it isn't already open. In either the Master List or the Concept Map, enter two more concepts, "Electron" and "Nucleus." These are the components of an atom and you could represent this relationship with links, as we have done before. Alternatively, you could make a Sub Map for "Atom" with "Electron" and "Nucleus" in it. This is done in one of several ways. You can activate both cards by clicking one and then, with the Shift key down, the other. Drag the two of them until the mouse arrow is pointing to "Atom." Letting go of the mouse key will "drop" them into the Sub Map of "Atom." Notice that the "Atom" note card icon changed to a stack, letting you know a Sub Map for it exists.

You can open the "Atom" Sub Map by pressing the Option key and double-clicking while the cursor is on the note card. The cards are entered in the Sub Map in the same relative position as they were in the Concept

Map so you may need to scroll or zoom the screen to locate them in the window. Your screen should now look something like this:

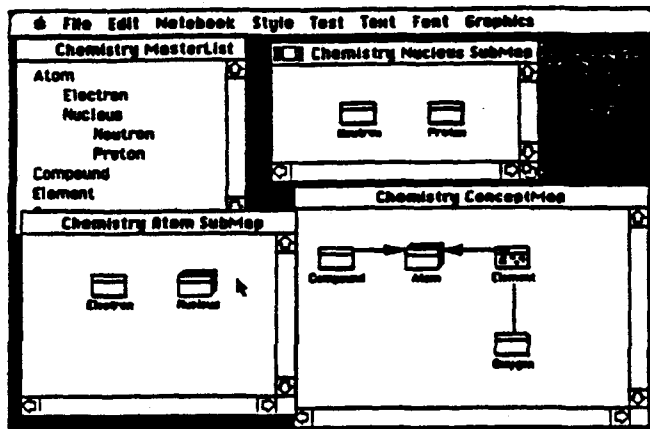


In the Sub Map you can move cards around, create links and even create Sub Maps (Or sub-sub maps, if you prefer). Another way to create a Sub Map in the Concept Map is to point to a card and Option-double-click it. This will open an empty Sub Map and you can create a note card in it or manually drag an existing note card across the window boundaries into the Sub Map.

## Master List

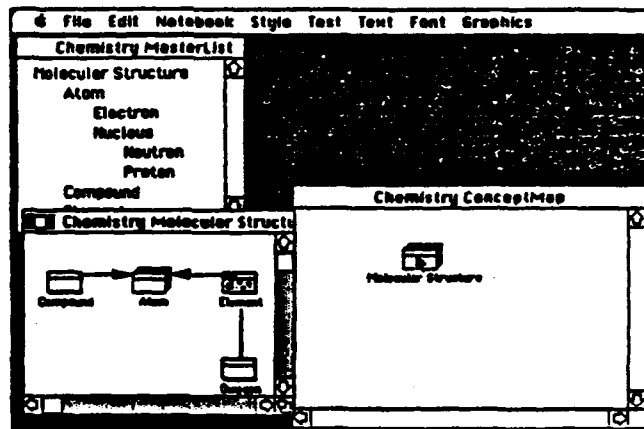
Notice that in the Master List "Electron" and "Nucleus" are now indented under "Atom" to correspond to the Sub Map. Indeed, yet another way to create a Sub Map is in the Master List. Place your cursor at the end of the "Nucleus" term in the Master List. Click once and hit Return. A "New" term is created at that same level, in the "Atom" Sub Map. Enter "Neutron," and hit Return, and enter "Proton." These are both components of a nucleus and you may want to use a Sub Map to represent this relationship. Drag the text cursor to highlight "Neutron" and "Proton" in the Master List. Now select Move Right from the Edit menu or use Command with the right bracket key (]). You have indented these terms to another level and created a Sub Map in the Concept Map for "Nucleus." An Option-double-click of the note card confirms that they are there. Sub Maps will

always open in the lower left corner and stack on top of ones already there, and you may want to rearrange the screen to see multiple windows. Your screen might look like this:



### Group/Extract

You may come to view a whole cluster of ideas as really one higher-order idea -- in other words you may want to create what is in effect a super-map. Let's say you feel that all of the concepts we have been working on so far can really be viewed as an integrated whole and belong in the Sub Map of a higher order concept called "Molecular Structure." You could create a card with that title and put everything into its sub map. An easier way to select all of the note cards is to place the mouse arrow in free space in the upper left hand corner of the Concept Map window, depress the mouse button and drag the box, or Marquee, until it surrounds all of the cards. As you release the button, all of the cards become highlighted. (An alternative, since you wanted to select all of the cards in the window, is to activate the Concept Map window and Select All from the Edit menu). With all of the cards selected, select Group from the Edit menu, or hit Command G. You now have one card at the top level and all of the Maps and Sub Maps within it. (Group can also work in the Master List.) Option double-click and you will see the original map now has a Sub Map. Retitle the card "Molecular Structure" and your screen should look something like this:



The cards and terms can be extracted from a Sub Map by selecting a card with a Sub Map and selecting Extract from Edit, or hitting Command E. You can also manually drag one or more cards out of a Sub Map on to the Concept Map or into another Sub Map. In the Master List, you can accomplish this by selecting all of the terms under "Molecular Structure" and selecting Move Left or hitting Command [. Try either of these with any of the cards under "Molecular Structure." Command ] returns them.

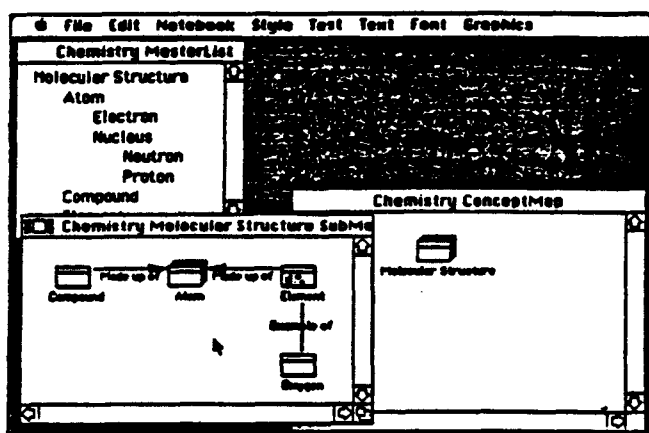
### Defining Links

Another advanced feature of Learning Tool is the ability to explicitly define links. You may want certain links to mean one thing in Chemistry and another in Art History. Learning Tool allows you to assign meaning to the three line types using the Legend box. Pull down the Style menu and select Legend.... You will get this box:

Legend		
	<input type="text"/>	<input type="checkbox"/> Show
	<input type="text"/>	<input type="checkbox"/> Show
	<input type="text"/>	<input type="checkbox"/> Show
<input type="button" value="OK"/> <input type="button" value="Cancel"/>		



Using our Chemistry example, fill in the Thin line as "Made up of." Click in the box next to the Medium line and enter "Example of." Clicking the Show box will display these definitions in the Concept Maps. Clicking them subsequently will turn them off. Likewise, the terms can be turned on or off in the Concept Map by double-clicking them or their lines. Your screen may look something like this:



## Searching Your Notes

As you go through a semester, your notes will accumulate. You may have difficulty remembering where you put certain information that you need to help you understand new ideas. The Find function allows you to specify one or two terms to search your notes. (The search is not case sensitive.) With two terms you can indicate whether you are looking for note cards with either or both terms. Select Find from the Edit menu, and you will get this box:

The "auto" option will perform a function on all the note cards in which the term(s) are found. Auto Open will open each note card's Detail window, positioning the text cursor on the specified term. Auto Print will print the contents of each card. Auto Ask will automatically present you with a test question from that note card. (We will look at the Test function next.)

Find initiates the search, identifies the title of the first card, and opens it, prints it, etc. if these options are selected. If the auto options have not been selected, you can Open, Print, or Ask at this point. Find Next directs the search to proceed to the next occurrence of the specified text. Find All will automatically go through all of the cards with the specified terms and perform the indicated operations. So, for example, it will go through and open all the cards with the specified term if Auto Open was selected. Try some searches to get the feel for it. When you are finished, close the Find box.

## Test

An important part of learning is practice. You want to be able to rehearse the recall and application of information in your notes. This will help increase your understanding and prepare you for exams. Learning Tool allows you to create self-tests to serve this purpose. There are two levels of tests: the Map level and the Detail level.

## Map Test

Selecting Map Test from the Test menu, or Command T, for a selected Map, will re-present the map with some of the note card titles randomly blanked out. The task for the test is to enter the correct title. This prompts you to reconstruct in your mind the relationships between the various concepts that you defined previously. It may also prompt you to reconsider and develop your understanding of these relationships. To take this self-test, position the cursor under the note card, click, and type in the term. Hitting return will either confirm your correct answer or blank out an incorrect answer for a subsequent trial. Correctness or incorrectness is based on a match that needs to be exact (except for upper and lower case differences). Typos and misspellings will be treated as incorrect. If you want to reveal the correct answer, just Option-click the term. Selecting Map Test from the Test menu will turn off the test and redisplay all the terms. Try a map test with your Chemistry map active.

## Detail Questions

The second type of test is the kind more frequently encountered in the classroom -- the short-answer question. Select "Nucleus" on the Master List or Concept Map. (Note: When a term that has a Sub Map is selected in the Master List, all terms indented under it are also selected. This will not affect the Test selection.) Select **Add Question...** from the Test menu. You will get a dialog box that looks like this:

To enter a question just begin typing. Formulating your thoughts into a question can help you understand an idea as much as getting an answer correct. While the recall of facts ("What is the nucleus composed of?" or "Who discovered the nucleus?") is frequently important, college level learning stresses the application, analysis, synthesis, and evaluation of information. A question like "What accounts for the fact that the mass of a nucleus is less than the mass of its component protons and neutrons?" is a deeper question that requires more thought and learning. This kind of question may lead your thinking into more understanding, not just what a nucleus is made of, but how it stays together.

Entering an answer is accomplished by clicking the Correct Answer box and typing. Cancel terminates the entry and closes the box without creating a question. Selecting OK will close the Question box.

When you want to take a test, select a note card you want to be tested on and select **Ask Questions** from the Test menu. Alternatively, you can use Command ? or Command /. You can also use the Find option with Auto Ask, as mentioned above, to select questions on a certain topic. The Question box will be presented with the correct answer hidden. Type in the answer. When you are finished, click Show to reveal your previously entered correct answer. Unlike computer-assisted instruction tutorials, Learning Tool does not evaluate

your answer and tell you that you got it right or wrong. You will need to evaluate your own answer, comparing the current response to the previously entered answer. Evaluating your own work is also part of learning. If the answers are different, maybe you need to go back to the book or ask the instructor to help you clarify your understanding. Or maybe you have learned more since you first entered the correct answer and the new answer is actually better. In this case, merely click Update and you will replace the old answer with the current, better one. Clicking Next will present the next question; selecting Prev will allow you to review. Remove allows you to retire the current question. You can edit a question using the **Edit Questions** item on the Test menu or you can edit them as you are taking a test. In either case, make changes in the Question box and click OK.

You are encouraged to enter questions, particularly these deeper ones, and test yourself on a regular basis throughout the term rather than just before an exam. For example, it is better to test yourself for twenty minutes on each of three days than to test yourself for an hour the day before the exam. Regular self-testing is a much more effective way to study and learn.

## Files

Advanced file management in Learning Tool allows you to have multiple notebooks open at the same time using the **Open** item in the File menu, as we saw earlier. One reason for doing this is that concepts in one course may be important to understanding those in another course. You may find that some of your notes on molecular structure in Chemistry are relevant to Atomic Physics, or that your European History course or Psychology course are relevant to your Art History course. Indeed, you may want to copy some of your notes from one notebook to another. One way to do this is to select a note card in the map of one notebook, Duplicate it using the Edit menu, and move it to the map of another notebook by dragging it there. The Detail file will follow along and be there too. You could also use this feature within a single notebook, creating a duplicate and, say, putting one card in one Sub Map and the second in another. Copy Window can be used to move text from the Master List or to move pictures of the entire contents of maps and windows (both text and graphics).

Another way of transferring notes from one notebook to another is to select a term, or range of terms, from the Master List, use Copy in the Edit menu and Paste it into the second notebook. All of the note cards, maps and sub maps, and detail windows falling within the range will be transferred as well. Note cards will not stay in the clipboard or scrapbook once you leave the Learning Tool application.

### Using Learning Tool with Other Applications

The functions of Learning Tool can be augmented by using it with other applications packages through the Macintosh clip board, scrapbook, or either of these in combination with the Switcher™. For example, let's say you wanted to take some of your notes and use them in a term paper. Merely open a note card Detail window, select the desired text and choose Copy from the Edit menu. Leave Learning Tool (although the Switcher eliminates the need to do this) and, without changing system disks, open MacWrite or another word processor. Position the text cursor and select Paste. Alternatively, you could cut and paste into the scrapbook and back.

You may also want to put complex graphics created in MacPaint™ or MacDraw™ into your note cards. The operation is similar. Moving from the graphics package to Learning Tool, open the desired note card Detail window, create a graphics frame and Paste. Try this now by taking the "fish" or some other graphic from the scrap book. Thunder Scan™ or other applications that create MacPaint files can be used to copy pictures or video images into your notes using this process.

As you work in Learning Tool, particularly if you are exploring it without the aid of the tutorial, you may occasionally encounter situations which are unexpected. This section is to help you through some of those problems. The following is a list of "problem" situations, how you may have gotten there, and what you might do about them.

**Unintentionally opened Detail window.** When working in the Concept Map you may find that you occasionally click on a card to select it and unintentionally open its Detail window. It may be that a double-click was detected by the mouse and it opens the window. If this happens frequently, you may want to adjust the sensitivity of the mouse key press on the Control Panel under the Apple menu in the upper left corner of your menu bar.

**Unintentionally created a new note card.** When working in the Concept Map you may find that you occasionally double-click on a line intending to select it or display its line label and unintentionally create a new note card. Most likely, you were not quite pointing to the line at the time; the cursor's arrow point needs to be touching the line. Alternatively, you may have intended to single-click in white space in the Concept Map and ended up creating a new card. This relates to the sensitivity of the mouse button, as mentioned above. You may want to select a less sensitive setting on the control panel. In either case, you can get rid of the unwanted card by selecting it in the Master List or Concept Map and choosing Clear from the Edit menu. On the Concept Map, just after you create the new card, it will appear to be selected already but not sensitive to the Clear command. That is because the term rather than the card is selected. Merely click the card (rather than the term) and clear it.

**You can't position note cards where you want to on the Concept Map or Sub Map.** Cards are positioned along an invisible grid in the Maps as a way of helping you keep them neat. However, you may want to arrange them in your own way and override the grid. This is done as you are moving a card or group of cards, by holding the Command key down as you drag.

**You "blank out" information in a note card Detail window.** It may be that you double-clicked white space outside of a frame. This is a shortcut way to

create another frame that occupies the entire window. If this is what you did, you really haven't lost your other information. If you resize the frame, by dragging the little black box in the lower right corner, you will probably find the other frame underneath. It can be moved by dragging on one of the frame's lines. Allowing you to put frames on top of one another enables you to mix graphics and text frames.

**You "lose" text at the bottom of a Detail window.** When you come to the bottom of a frame in a Detail window while entering text it will appear that it is no longer accepting your text. Actually, it is still there. Resize the frame by dragging the small black box in the lower right corner and you will find your text and more room to work.

**When printing, a page break occurs in the middle of a text or picture.** This can be minimized by using the Top of Page option on the printing instructions. This will position the beginning of each window or map at the top of a new page.

**When printing, you don't get all of the text or graphics in a Detail window frame printed out.** Only the text you choose to display in the window will be printed out. If the size of a frame is such that not all of the information shows, only that which does will print.

**You can't make changes in a graphics frame.** If the size of a graphics frame is such that all of the information is not showing, you will not be able to make any changes in the frame until you resize it to display all of the information.

**You can't find a note card in the Concept Map.** It may be that you can not find a note card that you know you entered and, in fact, is still on the Master List. It may be under another one. Normally, if a note card is placed on top of a second one it will go into its Sub Map, but this happens only if the arrow that drags it is positioned on the second card. It may be that you dragged a group of cards, and the arrow that dragged it was not pointing to a second card, but one of the cards in the group was placed on top of a second. This can also happen if you extract cards from Sub Maps. Merely move the cards around a bit and you should be able to find it under one of them.

**Double-clicking the title bar will not zoom down.** Double-clicking the title bar of any window will zoom it up to fill the whole screen; double-clicking it

again will zoom it down. Occasionally a window will not zoom down, perhaps because it was resized manually, and you will need to manually reduce it. After this it should operate normally.

Learning Tool may seem to slow down in redrawing window contents. When memory is available, Learning Tool uses a very fast way of redrawing changes or movement made in windows, as happens, for example, when you scroll. On the other hand, as your notebook becomes larger, more of the memory is used to handle the contents of the notebook and motion within windows may slow down some.

The paint can fills a shape slowly. It may take an inordinate amount of time for the paint can to fill a shape. The time will depend on the size of the shape and the size of the frame. The random access memory (RAM) chips in the newest Macintosh computers have the graphics functions built into them and this will eliminate the problem.

You get an error message when using the Help notebook. You may be using the Hierarchical File Structure and have the Help notebook in a separate file folder from Learning Tool. Make sure these are in the same file folder.

You get numerical codes in your error messages. Most error messages will be complete textual explanations. Some error messages, however, may mention a negative error code. These are standard Macintosh codes with interpretations listed in *Inside Macintosh*. When you get an error code that you can't handle, contact your campus microcomputer consultant or, if you purchased your copy of Learning Tool directly from Arborworks, Inc., give us a call.

People who have files created with a Beta version of Learning Tool encounter difficulties with their use in the final version. This, the final version of Learning Tool has a different document format than that used by the Beta test version. Learning Tool attempts to convert these files so they can be used with the current version. You may encounter difficulties in the conversion. Once converted, a file can not be used by the Beta test version.



## Windows

### Master List

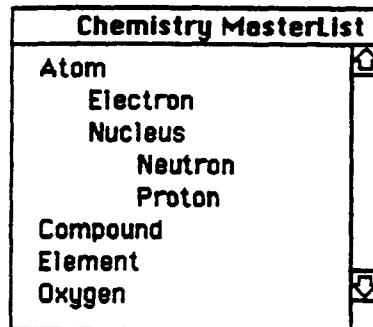
**Purpose.** The Master List window is where key ideas or terms are entered into your Learning Tool notebook in outline form. There is one Master List per notebook; however, any number of terms can be entered into it. The Master List is the window that you see in the upper left part of the screen when Learning Tool is first opened.

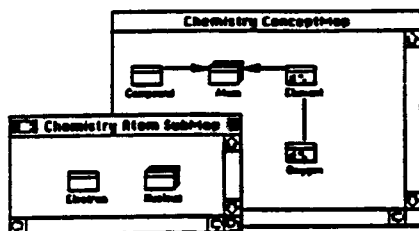
**Cursor.** Over an unactivated Master List the cursor will be the mouse pointer. Clicking the mouse button activates the window and places a flashing text cursor at that point, if it was clicked on text, or at the end of the nearest or last line of text if positioned in free space. If no entries have yet been made, the text cursor will be in the upper left corner ready for you to type in the first entry.

**Functions.** The Master List is automatically opened when Learning Tool or a particular notebook is opened. If you close the Master List it can be reopened from the Notebook menu or by using a Command L. As a Macintosh window the Master List window can be scrolled, resized, and repositioned. You can zoom the Master List (and other windows in Learning Tool) to fill the screen by double-clicking the title bar. Double-clicking again returns it to the previous size and location.

You enter text in an activated window merely by typing. Each entry corresponds to a note card in the Concept Map and can have up to 80 characters or spaces. Hitting Return creates a new entry on the next line initially titled "New." This entry is already selected and you can retitle it by typing your own term.

Clicking a term once positions the text cursor and allows insertion by typing or deletion by back spacing. Macintosh models with cursor keys will allow you to move through text easily. Clicking twice selects the whole term or line for cut-and-paste or move operations, as does click and drag across multiple terms. If a click and drag is done across both indented and unindented terms, all of the unindented terms at the selected level will automatically be selected. Moving a term or terms within the Master List is accomplished with the Move commands in the Edit menu. Move Up and Move Down will move a selected term within the Master List (Command + and Command - will do the same thing as will the cursor keys with Option depressed on the Macintosh models with cursor keys). This will have no effect on Concept Map cards. Move Right and Move Left (Command ] and [ and Option cursor keys) in the Master List correspond to moving selected cards in or out of the Sub Map and correspond to operations in the Concept Map. Cut, Copy, Paste, and Clear are also on the Edit menu. Selecting the text of a term by dragging the mouse cursor across it (just the term itself will be highlighted) allows the copying or cutting and pasting of that text. Selecting the term by double-clicking it highlights the width of the Master List window and allows you to copy or cut and paste it across Master Lists between two or more notebooks. This will also transfer the corresponding note cards and their Detail windows. Clicking a term in the Master List three times opens its Detail note card window. Option triple-clicking opens the term's Sub Map.





## Concept Map and Sub Maps

**Purpose.** The purpose of the Concept Map and Sub Maps is to allow you to create iconic representations of key ideas or terms and manipulate these, by positioning and linking them, in ways that correspond to relationships between concepts. There is only one Concept Map per notebook but it can have any number of Sub Maps or sub-Sub Maps. Any number of note cards can be created for a Map or Sub Map. The Concept Map is the window you see in the lower right hand corner when Learning Tool is opened.

**Cursor.** Over an activated or unactivated Concept Map the cursor will be the mouse pointer. Over the text of a selected note card icon it will be a text cursor.

**Functions.** The Concept Map is automatically opened when Learning Tool or a particular notebook is opened. If you close the Concept Map it can be reopened from the Notebook menu or by using a Command M. Sub Maps are created automatically by entering a note card or cards into another card's Sub Map, or created and opened manually by Option double-clicking a note card icon or by selecting the note card and selecting Sub Map from the Notebook menu or pressing Command S. Concept Map and Sub Map windows can be scrolled, resized, and repositioned in normal Macintosh fashion. You can zoom the Concept Map or Sub Maps (and other windows in Learning Tool) up to fill the screen by double-clicking the title bar. Double-clicking again returns it to the previous size and location.

You can enter a new card in the Concept Map by double-clicking in free space. This creates a note card icon in that position with the title "New." It also creates an entry in the Master List. The note card and its term are already selected, so re-titling can be accomplished just by typing. This retitles the term in the Master List as well. Clicking a term once allows insertion or deletion of text. Double-clicking a note card opens its Detail window. Option double-clicking opens the Sub Map.

Clicking (selecting) a note card and dragging will move the note card to a new location. The card will be aligned according to an invisible grid unless you use the Command key while positioning the card. You can move a note card to a Sub Map of another card by positioning it on top of that card and releasing it or by moving it into (or out of) the open Sub Map window of that card. You can also drag a note card into the Concept Map or Sub Map of another open notebook; this will transfer its Detail notes and Sub Maps as well. Clicking a note card with the Option key down and dragging will create a line of the type selected from the Style menu and will allow you to link the first note card to the card you are pointing to when you release the mouse button. Carrying a link up to and beyond the border of a window will automatically scroll it. Clicking a link will select it and allow you to change its style. Clicking and dragging in free space will create an elastic box, or Marquee, that can be used to select multiple note cards and links. Multiple note cards and/or links can also be selected or deselected by clicking each with the Shift key depressed.

## Detail Windows

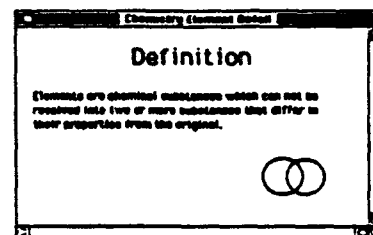
**Purpose.** The purpose of the Detail window is to provide you a space in which you can enter detailed textual and graphic notes for each of the key ideas or terms entered in the Master List or Concept Map. A Detail window can be created for each term and any amount of information can be entered into it.

**Cursor.** Over an unselected Detail window the cursor will be a mouse pointer. Over a selected Detail window the cursor will be a pointer over free space, a single box icon over an unselected text frame, or a double box icon over an unselected graphics frame. Clicking in a text frame will activate the frame and change the cursor to a text cursor, placing the blinking cursor where it was last positioned. If there is no text yet entered, the cursor will be in the upper left corner. Clicking a graphics frame activates the frame and changes the cursor into one of the graphics tool icons. The default icon is the pencil (for Draw), but other icons include a paint can (Paint Can), cross hairs (Line, Box, Oval), and box (Erase), and correspond to the identified functions from the Graphics menu.

**Function.** The Detail windows are not automatically opened when the Learning Tool is opened but can be opened when desired by either double-clicking a note card icon, selecting a note card icon and selecting Detail from the Notebook menu or pressing Command W, or by triple-clicking a term in the Master List. The Detail window can be scrolled, resized, and repositioned in normal Macintosh fashion. You can zoom the Detail window (and other windows in Learning Tool) to fill the screen by double-clicking the title bar. Double-clicking again returns it to the previous size and location.

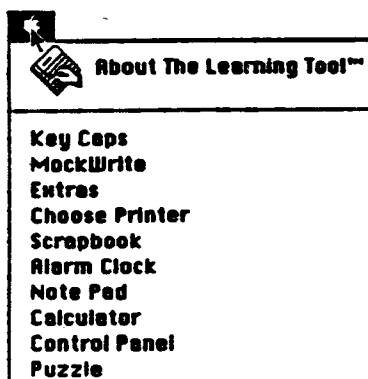
Within the Detail window are two types of frames: a text frame (identified when activated by a single border), and a graphics frame (identified by a double border resembling a picture frame). There can be multiple frames of both types and of various sizes in a Detail window. You can create a text frame by double-clicking free space in the Detail window, by pasting text into an open window, or you can just begin typing. Any of these will create a text frame the size of the window. A second way to create a text frame is to position the mouse pointer in free space in the Detail window, click, drag, and release. Graphics frames can be created by double-clicking or dragging if the Option key is depressed while they are performed. These frames can be moved within their Detail window by clicking any border and dragging. Moving or resizing a frame up to and beyond the border of a window will automatically scroll the window. Frames can be resized by clicking and dragging the small black box in the lower right corner. Resizing a graphics frame with the Option key down will resize, rather than crop, the drawing. Frames do not scroll. Frames can be placed on top of each other and if a large frame is placed on a small one, the small one will be covered. Text frames always appear as the top frame, if placed with graphics, and in this way graphics frames can be tiled.

In a text frame, you enter information by activating the frame, positioning the text cursor, and typing. Type face is determined by selecting from the Text and Font menus. All of the text in a frame is determined by these selections. Multiple type faces can be created using multiple frames. Text is automatically wrapped within a frame but the frame does not scroll or automatically resize as the type reaches the bottom of the frame. Type beyond the bottom of the frame will be entered and can be viewed by manually resizing the frame. Resizing the width of the frame will readjust the text. In a graphics frame, you enter information in standard MacPaint ways.



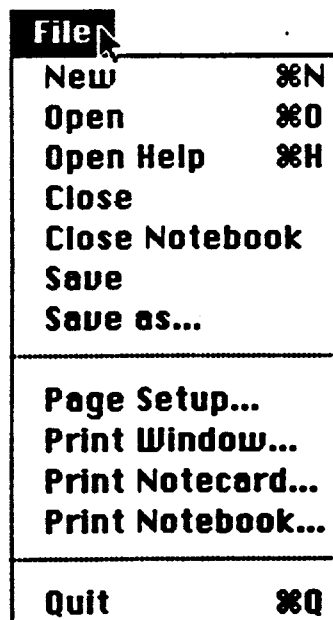
## Menus

### Apple Menu



The Apple menu is the black apple in the upper left corner of the menu bar. At the top of this list is **About Learning Tool**; this will give you information on the development and date of release of the package. The rest of the items on this menu will depend on the desk accessories you include in your system. Common accessories include the Scrapbook, Alarm Clock, Note Pad, Calculator, Control Panel, and Puzzle. Key Caps allows you to preview fonts in your system and their key assignments. Items can be added or removed using the Font/Desk Accessory Mover.

### File Menu



**New**, or Command N, opens a new notebook. More than one notebook can be open at a time.

**Open**, or Command O, opens a previously created notebook. A dialog box is displayed that allows you to indicate the desired notebook on the current disk or an alternative disk in a second drive or in the same drive if the current disk is ejected. More than one notebook can be open at a time.

**Open Help**, or Command H, opens the on screen Help notebook. The Help notebook operates like any other notebook in the Learning Tool. Scroll the Master List to find the command with which you need help. To access information on the term, triple-click it.

**Close** closes the current active window.

**Close Notebook** closes the current notebook and inquires about saving any work not saved previously and the titling of notebooks not previously titled.

**Save** saves current work to disk under the present notebook title.

**Save as...** saves the current work to disk under a notebook title that you provide.

**Page Setup...** can be used prior to a print command and allows you to specify the page arrangements.

**Print Window...** will print all contents of the current, open window, including Master List, Concept Map, Sub Maps, and Detail windows. All information in that window will be printed, not just that showing on the screen.

**Print Note Cards...** prints out the text and graphic contents of selected note cards. The note cards can be selected in the Concept Map or in the Master List.

**Print Notebook...** prints out the Master List, the Concept Map and Sub Maps, and all Detail windows as indicated in a dialog box. The "top of page" options will position the beginning of a map or Detail window at the top of the next print out page. Otherwise the print out will be continuous.

Print Notebook Options	
<input type="checkbox"/> MasterList	<input type="checkbox"/> With Page Numbers
<input type="checkbox"/> Details	<input type="checkbox"/> At top of page
<input type="checkbox"/> Maps	<input type="checkbox"/> At top of page
<div style="display: flex; justify-content: space-around;"> <span>OK</span> <span>Cancel</span> </div>	

**Quit**, or Command Q, closes all note books and the Learning Tool application, inquires about saving any current work not previously saved or the titling of notebooks not previously titled.

## Edit

**Undo**, or Command Z, selected immediately after the following operations restores the status prior to: Clear note cards and text and graphics frames, Edit text operations, Graphics operations.

**Cut**, or Command X, cuts selected text in the Master List and text and graphics in Detail windows and saves them in the Clipboard. Selecting terms in the Master List or note card icons in a map will save the terms, maps, and details to the Clipboard.

**Copy**, or Command C, copies selected text in the Master List and text and graphics in Detail windows and saves them in the Clipboard without cutting them. Selecting terms in the Master List or note card icons in a map will save the terms, maps, and details to the Clipboard.

**Paste**, or Command V, pastes information stored in the Clipboard into the appropriate space. Using it you can paste text or graphics into an appropriate Detail frame, and paste terms or cards into a Master List or map. In the latter case, the Master List terms, note cards, Maps, and Detail windows will all be transferred together.

**Clear** erases a selected term in the Master List or note card icon in a map and any accompanying Detail windows or maps. It can be used to erase text from an active Detail frame, or a link in a Concept Map or Sub Map. All of these except links can be restored if Undo is selected before any other operation is performed.

**Copy Window** copies a picture of the contents of the active window to the Clipboard. The contents of a Master List are treated as text; the contents of maps and Detail windows are treated as graphics.

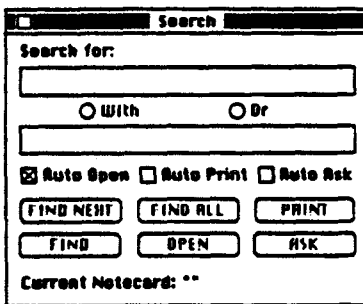
**Select All**, or Command A, selects for subsequent operation all elements in an active window; that is terms in the Master List, note cards and links in a map, text in a frame.

**Duplicate**, or Command D, duplicates a selected note card and its contents.

**Group**, or Command G, places selected map note cards and their links or Master List terms in the Sub Map of a newly created higher order map, initially titled "New."

Edit	
Undo	⌘Z
Cut	⌘H
Copy	⌘C
Paste	⌘U
Clear	
Copy Window	
Select All	⌘A
Duplicate	⌘D
Group	⌘G
Extract	⌘E
Find...	⌘F
Move Up	
Move Down	
Move Left	⌘[
Move Right	⌘]
Show Clipboard	





**Extract**, or Command E, pulls all of note cards in the immediate Sub Map of a selected map note card or Master List term and places them on the same level as the selected card or term.

**Find...**, or Command F, presents a dialog box in which you can specify one or two terms used to search the contents of note card Details. If two terms are used, you can specify if you want both or either used in the search. You can also specify what you would like done to the identified card. They can be opened, printed, or their test questions presented. This can be done automatically or manually as each card is identified.

**Move Up**, or Command +, moves a selected term in the Master List up one position in the list within the same map level. If you have a key pad, Macintosh XL, or Macintosh Plus, the up cursor key with Option depressed can be used to accomplish this as well. This change does not affect the Concept Map.

**Move Down**, or Command -, moves a selected term in the Master List down one position in the list within the same map level. If you have a key pad, Macintosh XL, or Macintosh Plus, the down cursor key with the Option key depressed can be used to accomplish this as well. This change does not affect the Concept Map.

**Move Left**, or Command [, moves a selected term or terms in the Master List into the higher order map of the term just above it in the list. Option left arrow can be used on the key pad. All of the terms within the range will move up one level in the Concept Map.

**Move Right**, or Command ], moves a selected term or terms in the Master List into the Sub Map of the term just above it in the list. Option right arrow can be used on the key pad. All of the terms within the range will move down one level in the Concept Map.

**Show Clipboard** shows any contents of the Clipboard.

## Notebook

**Master List**, or Command L, opens the Master List for the active notebook.

**Concept Map**, or Command M, opens the Concept Map for the active notebook.







**Sub Map**, or Command S, opens the Sub Map(s) for the selected map note card(s) or Master List term(s). This can also be accomplished by Option double-clicking a map card or Option triple-clicking a Master List term.




**Detail**, or Command W, opens the Detail window(s) for the selected map note card(s) or Master List term(s). This can also be accomplished by double-clicking a map card or triple-clicking a Master List term.

Notebook	
Master List	%L
Concept Map	%M
SubMap	%S
Detail	%W

## Style

**Style** allows you to select the type of line you would like to use to make links between concepts in the Concept Map. Three thicknesses of lines are available. You can also select the use of no, one, or two arrow heads. The direction of the arrow head is determined by the start and end of the link; the arrow points from the beginning of the link, or the first note card selected, to the second note card. The style of an existing link can be changed by selecting the link (clicking it) and changing the selection on the Style menu. This will also affect graphic lines. The **Legend...** selection displays a dialog box in which you can assign specific meanings or definitions to each line type. Clicking the Show box will display the assigned meanings on all maps and their print outs. You can also accomplish this by double clicking the link on a map.

Style	
	Thin Line
	Medium Line
	Thick Line
<hr/>	
	No Arrow
	Arrow
	Arrows
<hr/>	
Legend...	

Legend	
	<input type="text"/> <input type="checkbox"/> Show
	<input type="text"/> <input type="checkbox"/> Show
	<input type="text"/> <input type="checkbox"/> Show
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	

**Test**

Map Test	⌘T
Ask Questions...	⌘?

Add Question...
Edit Questions...

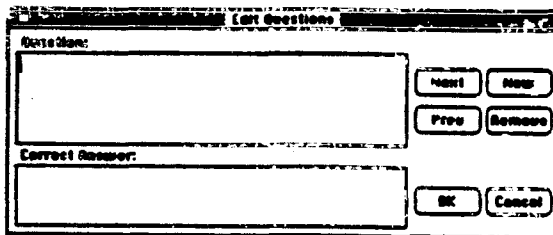
**Test**

**Map Test**, or Command T, will redisplay an active map window giving you a self-test in which some note card titles are deleted. The task is to determine the title, click under the note card, type in the correct term, and hit Return. If you are correct, the term will remain. An incorrect response will be deleted and you may try again. The correctness of the term is based on an exact match, tolerant of case, with the term you have already assigned to the card. If you want the term for a card revealed, simply Option-click it. If you want all of the missing terms revealed, select **Map Test**, or Command T, again.

**Ask Questions...**, or Command ? or Command /, will give you a question or series of questions previously entered by you for a selected note card or for an open note card Detail window. A dialog box will appear with the previously entered question and a blank box for **Your Answer**. Type in your answer and select **Show** to reveal the previously entered **Correct Answer**. You must then compare the answers and decide if the current answer is correct. If it is in fact an even better answer, select **Update** and the current answer will be entered as the correct answer. Next will present the next question for the selected card, if there are any more. **OK** terminates the test. **Cancel** will terminate the test without saving any changes.

**Add Questions...** allows you to enter a question for a selected note card or for an open note card Detail window. You enter the **Question** and the **Correct Answer** and these will be displayed subsequently at the appropriate time when **Ask Questions...** is selected for that card. **OK** stores the question and closes the dialog box, and **Cancel** terminates the question entry session without storing the entered question.

**Edit Question...** presents the previously entered questions of a selected note card or open note card Detail window for your editing. **Next** and **Previous** allow you to flip through the questions created for the selected note card. **OK** stores the changes and closes the dialog box, while **Cancel** closes the box without storing any changes. **Remove** allows you to retire an item, while **Add** allows you to enter another.



## Text

The **Text** menu allows you to specify the type face in the Master List or map windows, or in Detail text frames. All of the text in the selected Master List, map, or text frame will be affected by the selection. **Plain**, or **Command P**, specifies a standard type face. The following type faces are available:

**Bold**, or **Command B**  
**Italic**, or **Command I**  
**Underline**, or **Command U**  
**Outline**  
**Shadow**

Text  
 Text  
Text  
 Text  
 Text

**Left**, **Center**, and **Right** refer to the alignment of text.

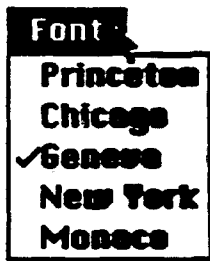
Point size of type face can also be selected:

**9 Point**  
**10 Point**  
**12 Point**  
**14 point**

Text  
 Text  
 Text  
 Text

Preferred font sizes for the selected font are shown in outline.

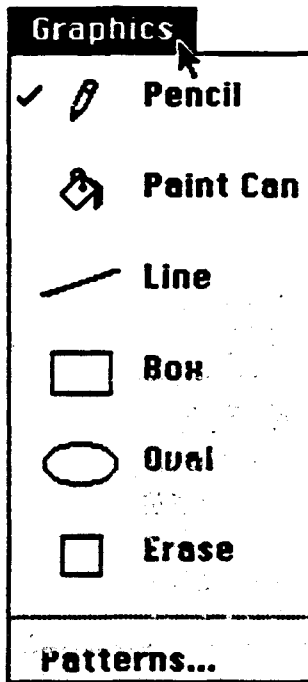
Text	
✓ Plain	⌘P
Bold	⌘B
Italic	⌘I
Underline	⌘U
Outline	
Shadow	
Left	
✓ Center	
Right	
9 Point	
10 Point	
12 Point	
14 Point	
18 Point	
24 Point	



## Fonts

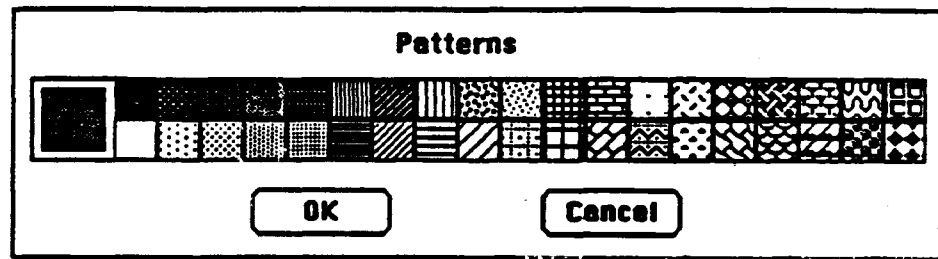
The **Font** menu allows you to select the specific font style for the Master List or map windows, or Detail text frames. All of the text in the selected Master List, map, or text frame will be affected by the selection. The specific fonts available in the **Font** menu are determined by you and can be changed with the **Font/DA Mover** utility supplied by Apple. One public domain font that is included because of its utility is the **Princeton** font. In addition to the standard alphabet set, this font set also has Greek letters and superscripts and subscripts useful in mathematics and science.

Permission to use Princeton Font 3.2L (Imagewriter bitmapped) on this disk was obtained from S. H. Lam of Princeton University. Because of disk space limitation, the documentation files and the downloadable LaserWriter font files could not be included on this disk. You may obtain a copy of the latest version of Princeton font by sending a blank disk (400K or 800K), a SASE disk mailer to S. H. Lam, Dept. of Mechanical and Aerospace Engineering, Princeton University, Princeton NJ 08544. Contributions to support this public domain font are strongly encouraged: for individuals, we suggest \$30.00 and for institutions, we suggest \$100.00 (invoice available if needed). Checks should be made payable to Princeton University.



## Graphics

The **Graphics** menu changes the function of the cursor in the graphics frames in Detail windows. These graphics functions allow you to sketch simple line drawings using the **Pencil**, **Paint Can**, **Line**, **Box**, and **Oval** as you click and drag the mouse. The thickness of the lines with the **Line** selection are determined by the **Style** menu, as are the use of arrow heads. **Erase** allows you to erase part or all of your picture. **Patterns** determines the "paint" in the paint can. Holding down the **Option** key enables you to draw with the current pattern.





These are some additional thoughts and suggestions as to how you can study better and use Learning Tool to help you learn.

**Top down.** The Chemistry example used in the tutorial can be described as a top-down approach to studying. You begin entering the key ideas that capture the domain of the topic. You interrelate these ideas, and then fill in secondary ideas, perhaps in Sub Maps. Finally you enter details.

**Or bottom up.** On the other hand, you may first be struck by significant facts and important details. You can begin by creating note cards, maybe even leaving them untitled, and fill in detailed information. Afterwards, you summarize these facts by titling the note card. Then you look for connections or patterns between them. Whether you start at the "top" or the "bottom" or use some combination matters less than identifying patterns and relationships among ideas.

**Study to answer questions.** It may help to keep your studying focused if you pose questions as you go along in your studies. Use the Test option to enter questions as you begin reading a chapter or reviewing your lectures notes, and fill in the answers as you come to them.

**Keep your notes fluid.** Entering notes in the computer makes it much more flexible than writing them on paper. Take advantage of the capabilities of this powerful technology. As your understanding of a topic changes, make changes in your notebook. Enter new terms and details and add questions. You may even find that a new insight causes you to totally restructure your Map. That's great; and with a computer it is easy to do. You may even want to keep more than one note book for a course, structuring the topics differently in each to represent different orientations or perspectives. Because you can have more than one notebook open at a time, this is also easy to do.

**Use what you already know.** There is very little that you don't already know something about. You may have taken a course on the topic in high school or read a book or article about it or have your own ideas on it. Begin with these. Before you even go to the first lecture or read the first chapter, begin entering your thoughts. So what if they change; they may even be inaccurate or wrong--you can always change them. Entering them first will sharpen your focus and make it easy to make comparisons and contrasts.

**Make learning personal.** On almost any topic you probably have had some personal experience that relates to it. Playing baseball and pool has a lot to do with physics. Having brothers and sisters and a father and mother has a lot to do with sociology and psychology. Draw on your personal experiences; enter them in your note cards.

**Test yourself frequently.** Frequent testing is important to learning. It is better to test yourself an hour each week in a subject and to study for several days just prior to the test. Add questions frequently and change old ones as your knowledge becomes more complete.

**Review periodically.** Review is also important. Every now and then reread your notes. Think them over. Make additions and changes. This will keep the ideas fresh in your mind and make them easy to recall at test time.

**Use Learning Tool to help you organize your term papers.** Not only can you use Learning Tool to help you study, you can use it to help you with your term papers. With a new notebook, begin entering the key ideas. Enter secondary ideas in their Sub Maps. Fill in the Detail windows with supporting facts and examples. Use the ordering functions in the Master List to arrange and rearrange the sequence. Use the print functions to give you drafts. And finally, use the Clipboard to move your ideas to a word processor to polish it into a professional looking paper.

**Use Learning Tool as a data base.** You can use Learning Tool not only to organize your course notes but other aspects of your life as well. You can use it as a free-form data base for phone numbers and addresses of friends or to organize your record and tape collection. You can create a template and store it in the Scrapbook and Paste it into a new note card to be filled out. For example, you could have a blank form with Name, Phone number, and Address saved in the Scrapbook and copy and paste it into a note card created for a new friend and fill it in with the vital information.

If you know that all or a large number of your students have Learning Tool and access to Macintoshes, here are some ideas that might help you use it in your classes. Even if some students don't have this access, the ideas here are general and may be implemented to a certain degree with paper and pencil.

**Customize Learning Tool to the subject matter.** Learning Tool is a general purpose package; students can use it for any of their courses. The downside of this is that there is nothing in it that is specific to a particular course. You can make this important link. There are a number of ways that you can do this. You can enter key ideas and have the students elaborate on them, or fill them out, or organize them. You can enter questions and have them enter answers; or you can enter answers and they can enter the questions. You may also want to enter important reference materials (like the periodic table) that would be tedious and unproductive for each student to enter. All of this can be done by making a notebook on your system and distributing copies to your students. Learning Tool is as easy for professors to use as for students, and much easier than "authoring" packages.

**Don't do the work for your students.** As tempting as it may be to just go ahead and enter all of your lecture notes on a notebook and hand it out, this would actually reduce its effectiveness. It really wouldn't be much different than just handing them the text book. Learning Tool works to the extent that it prompts students to study and study effectively and efficiently. You can help them by getting them started, but let them do the work. Learning is correlated with mental effort.

**Use it to help you organize your lectures.** On the other hand, Learning Tool may actually help you to organize your lectures better. It may sharpen your thoughts on what's important, what you really want to get across. It may aid in the coherence of your ideas and supporting facts and studies. It may also help you in your own research and scholarly work. You can use it while collecting and organizing bibliographic citations or listing hypotheses and supporting or refuting studies.

**Use it as a diagnostic tool.** You can use Learning Tool to help you find out how students are understanding the subject matter. By asking students to print out and turn in their Concept Maps, you can quickly get an overview of how your students are thinking about the topics you have covered, what ideas they see as important, and how they are interrelating them. You can also use it to find out what they already know when they come into your class. Asking them the first week to put their ideas into the Learning Tool using only the Master List and Concept Maps, can give you an overview of their entering knowledge (it will also help them get started). This can help you modify your lectures for a particular group of students. However, for this to work as a diagnostic device, it is important to remember not to grade these exercises.

**Start a group notebook.** In addition to notebooks your students maintain individually, you may also want to keep a class notebook. This would be a collaborative effort to which all students could contribute. However, you may want to set up some criteria (or have the students do so) by which information can be entered. This may require students to publicly defend their proposed additions, or changes, or deletions to the rest of the class, prompting them to carefully think through their proposals.

## Robert B. Kozma, Ph.D.

Bob is an Associate Professor at the School of Education, an Associate Research Scientist at the Center for Research on Learning and Teaching, and Director of the Program on Learning, Teaching, and Technology at the National Center for Research to Improve Postsecondary Teaching and Learning, all at The University of Michigan. He chairs the instructional technology program at the School of Education and its graduate program in Computers and Education. Bob conceived of the idea of the Learning Tool and designed it with John Van Roekel.

## John Van Roekel

John is the President of Arborworks, Inc. and the developer of the Learning Tool. Before creating Arborworks with Bob, John was the Director of the Computer Aided Engineering Network at the College of Engineering, at The University of Michigan. He has had 14 years of software development experience. He has managed software development for a number of computer companies. John has a B.S.E in aerospace engineering and an M.S. in computer engineering, both from The University of Michigan.

We would also like to express appreciation to our advisory board at The University of Michigan:

Carl Berger, Dean of the School of Education  
 Fred Goodman, Professor, School of Education  
 John Jonides, Professor of Psychology  
 Karl Zinn, Research Scientist, The Center for  
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